CONTECH ENGINEERED SOLUTIONS

VortSentry® HS

Technical Abstract
Removal Characteristics Using F-55

The VortSentry® HS

The VortSentry HS is a hydrodynamic separator that facilitates the settling of solids and the separation of free oil and grease commonly found in stormwater runoff.

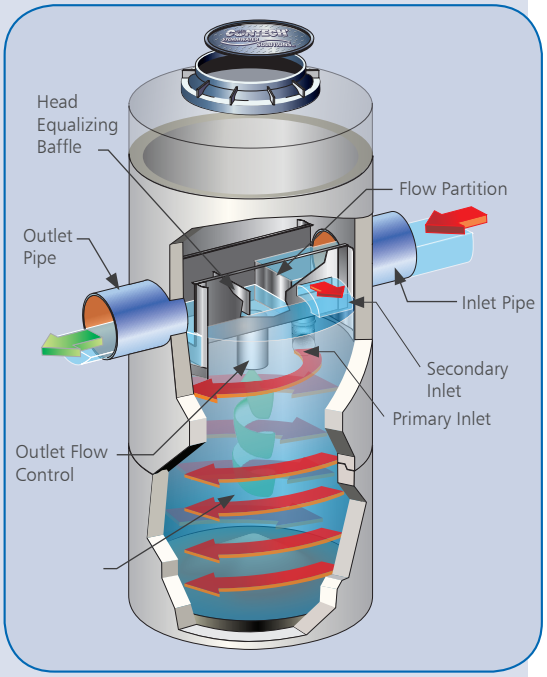
The Testing

The performance characteristics of the VortSentry HS were assessed under controlled laboratory conditions using F-55, commercially available sand product.

The Conclusion

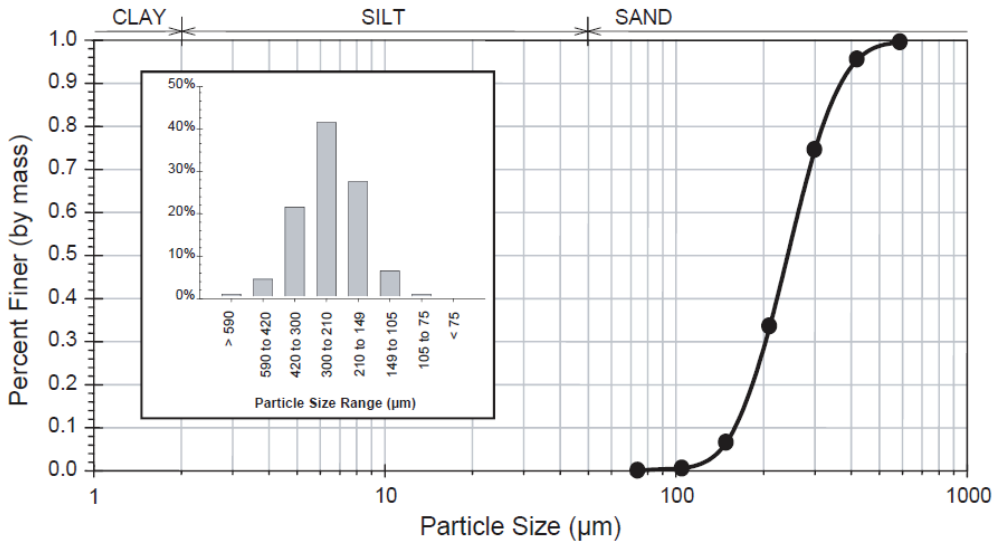
Testing successfully identified the operating characteristics of the VortSentry Model HS48 for flows up to 1.5 cfs and allows the following to be determined:

- The VortSentry Model HS48 provides removal of solids (d50=240-um) demonstrating >80% removal at flows below 1.2 cfs
- The VortSentry Model HS48 experiences 1-inch of head loss for every 0.25 cfs of flow up to 2.0 cfs.



Contaminant Tested

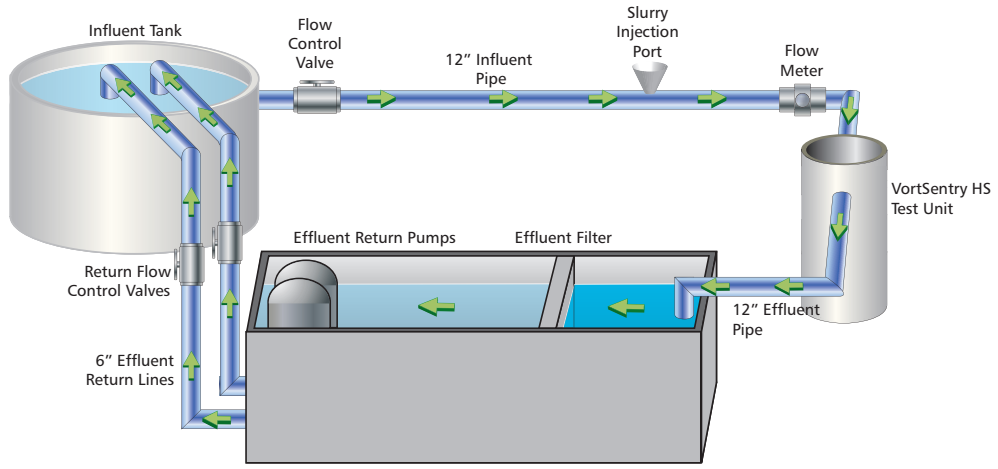
CONTECH Stormwater Solutions used the commercially available sand product F-55 for laboratory solids removal testing of the VortSentry HS model HS48. Manufactured by U.S. Silica Company as a foundry sand, F-55 is a natural silica sand product (SG=2.65) consisting of round grain sand processed to produce a particle distribution of 100-μm to 600-μm with a d50 of approximately 240-μm. Particle size distribution is shown below.



Test Apparatus and Operation

The VortSentry HS is a hydrodynamic separator which uses swirl-concentrator technology to enhance gravity separation. A typical VortSentry HS configuration as shown at left. The performance evaluation consisted of multiple runoff simulations, with the cleaning and refilling of the slurry tank between each simulation. Each simulation began with predetermined flow rates, and after attaining steady-state fl ow, slurry was injected at a predetermined rate. Three residence times were allowed, and then samples were taken at one-minute intervals.

The VortSentry HS test unit was tested using a recirculation system as shown below.



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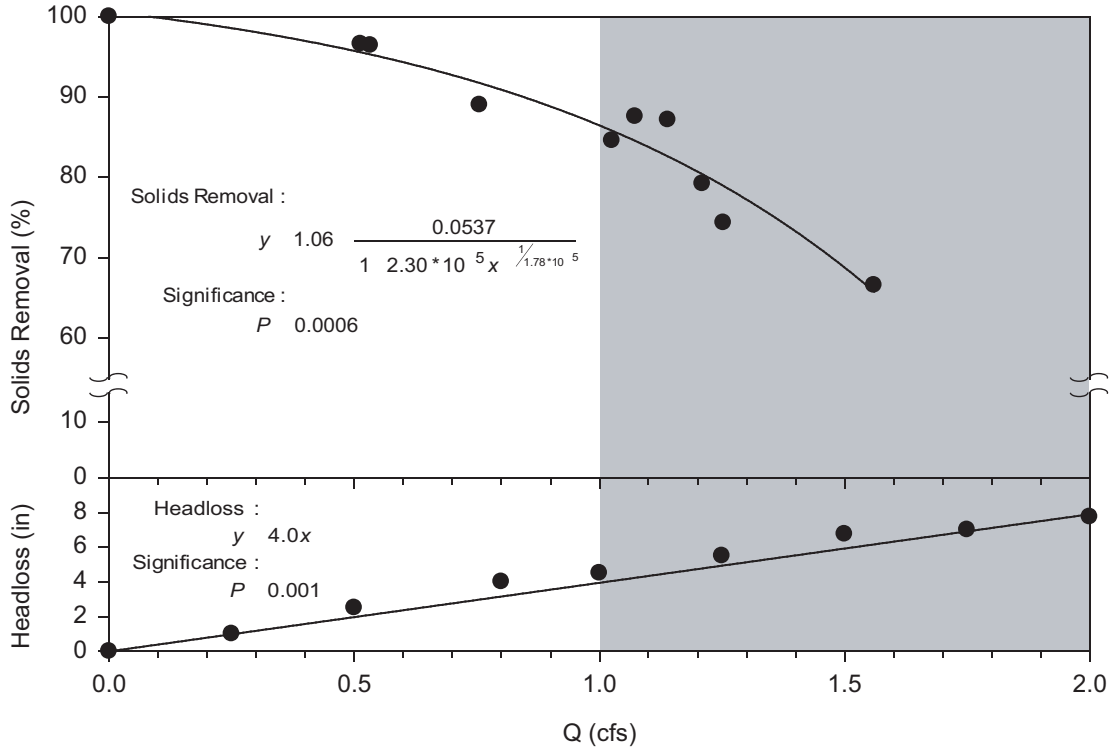
Test Results

A total of nine simulations were performed at fl ow rates between 0.51 and 1.56 cfs. Results are shown in the table below. Removal efficiencies were calculated by averaging the influent and effluent solids concentrations corresponding to a simulation and applying the following standard formula:

Removal Efficiency % = ((*influent solids conc.*) – (*effluent solids conc.*)) / (*influent solids conc.*)

Average Q (cfs)	0.51		0.53		0.76		1.03		1.07		1.14		1.21		1.25		1.56	
Sample Location	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.
Concentration (mg/L)	377	7	246	18	295	43	322	68	285	28	332	35	328	73	365	81	323	76
	357	11	289	13	304	27	353	52	261	27	296	51	302	68	327	88	261	93
	332	15	271	8	298	42	334	59	232	30	388	58	313	57	375	87	272	76
	278	9	275	4	284	28	337	38	226	25	280	28	286	58	277	82	293	109
	329	13	274	10	281	21	306	48	218	36	281	36	294	63	316	81	253	91
	319	13	272	4	269	19	343	43	225	35	313	37	293	58	307	85	264	112
Average (mg/L)	332	11	271	10	288	30	333	51	241	30	315	41	302	63	328	84	278	93
Efficiency	97%		96%		90%		85%		88%		87%		79%		74%		67%	

The performance curve based upon flow is shown below and demonstrates a gradual decrease in performance as flow increases to approximately 1.5 cfs. Headloss observations indicate that the headloss relationship is reasonably linear, with 1-inch of headloss for every 0.25 cfs of fl ow up to 2.0 cfs.



To see the complete product evaluation report (PE-G141), please contact your Contech Stormwater Consultant.